



## PLACENTAL THICKNESS IN THIRD TRIMESTER ANTENATAL SCANS AND ITS CORRELATION WITH FETAL BIOMETRY.

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**ABSTRACT** **Objective:** The aim was to study the correlation of placental thickness, measured at the level of the umbilical cord insertion, with the fetal biometry in third trimester antenatal scans. **Methods:** In this study, total 296 patients were included. The study was conducted on pregnant women in third trimester who were unequivocal about the LMP. The antenatal subjects attending the antenatal clinic at Kamla Nehru State hospital for mother and child and IGMC Shimla were enrolled for the study. All antenatal mothers with known LMP at their antenatal visit between 28- 40 weeks of gestation irrespective of their prior scans, who satisfied the inclusion and exclusion criteria were subjected to ultrasonographic examination. The placental thickness along with fetal biometry parameters were measured and recorded. **Results:** There was a significant correlation between placental thickness and biparietal distance ( $r=0.139$ ;  $P=0.017$ ) and placental thickness and femur length ( $r=0.176$ ;  $P=0.002$ ). **Conclusion:** The present study was aimed to determine the correlation of ultrasonographic placental thickness with fetal biometry. And significant correlation between fetal parameters and placental thickness was noted.

**KEYWORDS :** biparietal diameter ,fetal biometry ,placenta thickness,ultrasound

### I. INTRODUCTION

Placenta is a materno-foetal organ which is a reflection of health and size of the foetus. Placental Thickness (PT) can be used as a new parameter to estimate the gestational age of the foetus. The placenta is a foetal organ which provides the physiologic link between a pregnant woman and the foetus with important Keywords: Gestational age, Normal singleton pregnancies, Placental locations, Placental growth metabolic, endocrine and immunologic functions besides being responsible for nutrition, respiration and excretion for the foetus, acting as a barrier; it has a role in protecting the foetus from noxious agents.

According to Sadler et al., (2004), at term placenta is approximately 3 cm thick and measures 15-25 cm in diameter. It is also very important to differentiate between normal and growth restricted fetuses. The exact knowledge of gestational age is also important for undertaking various diagnostic procedures (Chorionic villous sampling and amniocentesis) that need to be performed within a narrow range of a particular gestational age. While fetal biometry is one of the most common method of determination of gestational age and weight alternative methods such as measurement of placental thickness can also be used for determination of gestational age. Fetal biometry (Biparietal diameter, Head circumference, abdominal circumference and femur length) is routinely used to determine gestational age after 12 weeks of pregnancy. Placental thickness is an important parameter in estimating fetal growth, the placental thickness changes with increasing growth of fetus. It is different in all 3 trimesters. So, it can be used as another parameter to estimate gestational age (GA). It seems reasonable that evaluation of placental thickness in second and third trimester could help to determine normal development and placental functions and deserves to be a good predictor of fetal growth and birth weight. Any impairment in its development may have a profound impact on fetal development and pregnancy outcome. This prediction of growth restricted pregnancies from placental size is based on the fact that diminished placental size precedes fetal growth restriction. Placental thickness is very much related to fetal development and may be a key in perinatal outcome.

So, this study was focused on correlation of placental thickness and fetal parameters and amniotic fluid index.

### II. MATERIAL AND METHODS

This observational cohort study was conducted in the department of radiodiagnosis at IGMC Shimla and Deptt. Of obstetrics and gynaecology at Kamla Nehru Hospital for mother and child, Shimla over a period of one-year w.e.f 1<sup>st</sup> July 2018 to 30<sup>th</sup> June 2019.

The study was conducted on pregnant women with pregnancy between 28 weeks to 40 weeks who were unequivocal about the LMP. The antenatal subjects attending the antenatal clinic at Kamla Nehru State hospital for mother and child and IGMC Shimla were enrolled for the study irrespective of the parity. The research procedure was in accordance with the approved ethical standards of Indira Gandhi Medical College and Hospital, Shimla, Ethics Committee. An informed written consent was taken from all participants (Appendix I) and cooperation was requested for the study.

A detailed history was taken to check following inclusion and exclusion criteria, and all the participants underwent a thorough general physical and detailed obstetrical examination, and findings were recorded on predesigned patient proforma.

#### Inclusion Criteria

1. Singleton uncomplicated pregnancies with confirmed LMP
2. Gestation between 28 to 40 weeks.

#### Exclusion Criteria

1. Gestational diabetes
2. Anemia
3. Fetal anomalies
4. Multiple pregnancies
5. Irregular menstrual cycles
6. Last menstrual period not known
7. Chorioamnionitis
8. Maternal infections
9. Hydrops fetalis

All antenatal mothers with known LMP at their antenatal visit between 28- 40 weeks of gestation irrespective of their prior scans, who satisfied the inclusion and exclusion criteria were subjected to ultrasonographic examination. After estimating the fetal age by BPD, HC, AC and FL, the placental thickness and amniotic fluid index (AFI) were measured and recorded along with estimated fetal weight.

Ultrasonographic examination was performed in the Kamla Nehru State Hospital and IGMC Hospital and performed using a 3.5MHz convex transducer on Logiq P6(GE) machine. It was performed with optimally filled bladder with the mother in the supine position.

Placental thickness was measured in millimetres at the level of umbilical cord insertion in its longitudinal direction and the mean of 3 readings was taken ( $\text{mean} = R1 + R2 + R3 / 3$ ) and were recorded.

While measuring the thickness of placenta, the callipers were perpendicularly placed. Measurement was done when uterus was fully relaxed at level of cord insertion.

### STATISTICAL ANALYSIS

Data were presented as frequency, percentage, mean, and standard deviation. Quantitative variables between 2 groups and more than 2 groups were compared using Student t-test and one-way ANOVA respectively. Two variables were correlated using Spearman correlation coefficient. P value  $<0.05$  was considered significant. Statistical analysis was performed using SPSS v21.

### III. OBSERVATIONS AND RESULTS

The present study was aimed to determine the ultrasonographic placental thickness and its correlation with fetal biometry. A total of 296 patients were included in the study over the period of one year in Department of Radiodiagnosis, Indira Gandhi Medical College (IGMC), Shimla (Himachal Pradesh). Results of the study are described as follows:

### Placental thickness

We observed that mean placenta thickness was  $3.66 \pm 0.92$  cm.

### Relation between placental thickness and other fetal parameters

We observed that there was a significant correlation between the placental thickness and biparietal diameter ( $r=0.139$ ;  $P=0.017$ ) and placental thickness and femur length ( $r=0.176$ ;  $P=0.002$ ).

**Table 1: Relationship between placental thickness and other parameters.**

	R	P Value
Biparietal distance	0.139	0.017
Head circumference	0.084	0.149
Abdomen circumference	0.111	0.056
Femur length	0.176	0.002
AFI	0.010	0.858

### IV. DISCUSSION

A normally functioning placenta is required for normal fetal growth and development. It has been historically documented that placental weight in a normal pregnancy at term is about one-fifth of the fetal weight. The size of placenta increases during fetal growth period to allow it to carry out its vital functions. If the fetal growth is compromised it is due to the abnormal functioning of the placenta which can be detected by the abnormal placental measurements.

We observed mean placental thickness was  $3.66 \pm 0.92$  cm. Balla et al. studied ultrasonographic placental thickness in 53 Sudanese pregnant women in second and third trimesters. They concluded that thickness of less than 25 mm during third trimester is less than normal and might be an indication of intrauterine growth restriction and thickness of more than 45 mm was considered thicker than normal, which might be an indication of maternal diabetes, hypertension, fetal hydrops and other abnormalities. Normal values of placental thickness in normal singleton fetuses were in range of 25–45 mm in the 3rd trimester, and between 18 and 24 mm, in the second trimester. The fetal biometric parameters measured most commonly are biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC) and femur diaphysis length (FL). These biometric measurements can be used to estimate fetal weight (EFW) using various different formulae. Ultrasonography (US) enables the evaluation of the placenta and the detection of placental abnormalities using different parameters such as placental thickness and volume or special techniques like three-dimensional (3D) power Doppler. Recent studies have focused on 3D measurement of placenta to predict the adverse pregnancy outcome; however, this technique is relatively new, needs complex clinical setting and gives conflicting results regarding its reproducibility in measuring placental thickness.

### V. CONCLUSION

- The present study was aimed to determine the correlation of ultrasonographic placental thickness with fetal biometry. A total of 296 patients were included in the study over the period of one year in the Department of Radiodiagnosis, Indira Gandhi Medical College (IGMC), Shimla (Himachal Pradesh). There was a significant correlation between placental thickness and biparietal distance ( $r=0.139$ ;  $P=0.017$ ) and placental thickness and femur length ( $r=0.176$ ;  $P=0.002$ ).

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